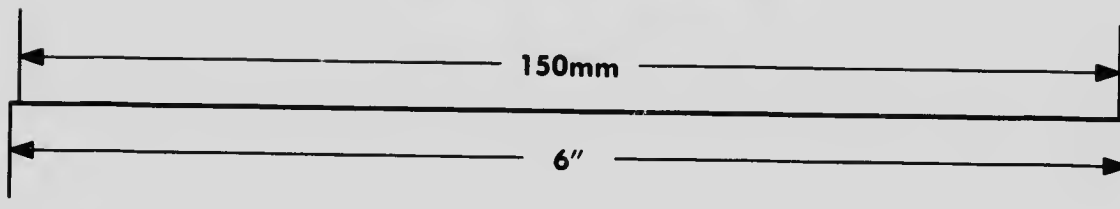
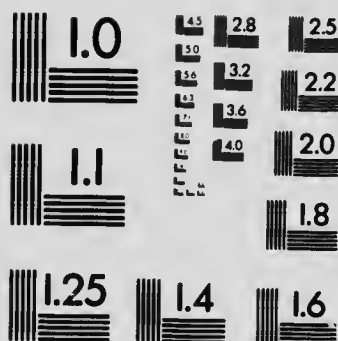
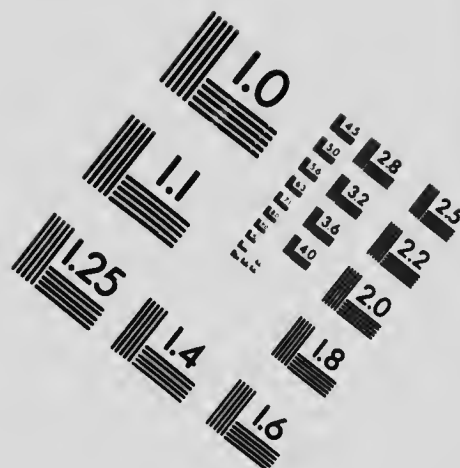
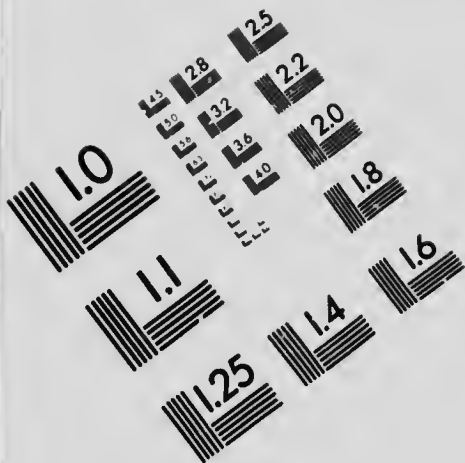
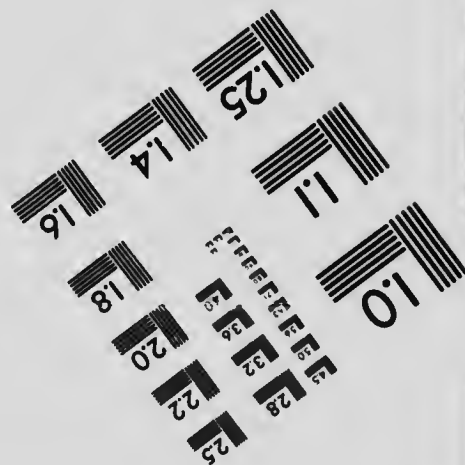


# IMAGE EVALUATION TEST TARGET (MT-3)



APPLIED IMAGE, Inc  
1653 East Main Street  
Rochester, NY 14609 USA  
Phone: 716/482-0300  
Fax: 716/288-5989

© 1993, Applied Image, Inc., All Rights Reserved



**CIHM  
Microfiche  
Series  
(Monographs)**

**ICMH  
Collection de  
microfiches  
(monographies)**



**Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques**

**© 1994**

# Technical and Bibliographic Notes / Notes techniques et bibliographiques

The Institute has attempted to obtain the best original copy available for filming. Features of this copy which may be bibliographically unique, which may alter any of the images in the reproduction, or which may significantly change the usual method of filming, are checked below.

L'Institut a microfilmé le meilleur exemplaire qu'il lui a été possible de se procurer. Les détails de cet exemplaire qui sont peut-être uniques du point de vue bibliographique, qui peuvent modifier une image reproduite, ou qui peuvent exiger une modification dans la méthode normale de filmage sont indiqués ci-dessous.

☐ Coloured covers/  
Couverture de couleur

☐ Coloured pages/  
Pages de couleur

☐ Covers damaged/  
Couverture endommagée

☐ Pages damaged/  
Pages endommagées

☐ Covers restored and/or laminated/  
Couverture restaurée et/ou pelliculée

☐ Pages restored and/or laminated/  
Pages restaurées et/ou pelliculées

☐ Cover title missing/  
Le titre de couverture manque

☒ Pages discoloured, stained or foxed/  
Pages décolorées, tachetées ou piquées

☐ Coloured maps/  
Cartes géographiques en couleur

☐ Pages detached/  
Pages détachées

☐ Coloured ink (i.e. other than blue or black)/  
Encre de couleur (i.e. autre que bleue ou noire)

☒ Showthrough/  
Transparence

☐ Coloured plates and/or illustrations/  
Planches et/ou illustrations en couleur

☐ Quality of print varies/  
Qualité inégale de l'impression

☐ Bound with other material/  
Relié avec d'autres documents

☐ Continuous pagination/  
Pagination continue

☐ Tight binding may cause shadows or distortion along interior margin/  
La reliure serrée peut causer de l'ombre ou de la distorsion le long de la marge intérieure

☐ Includes index(es)/  
Comprend un (des) index

☐ Blank leaves added during restoration may appear within the text. Whenever possible, these have been omitted from filming/  
Il se peut que certaines pages blanches ajoutées lors d'une restauration apparaissent dans le texte, mais, lorsque cela était possible, ces pages n'ont pas été filmées.

Title on header taken from: /  
Le titre de l'en-tête provient:

☐ Title page of issue/  
Page de titre de la livraison

☐ Caption of issue/  
Titre de départ de la livraison

☐ Masthead/  
Générique (périodiques) de la livraison

☐ Additional comments: /  
Commentaires supplémentaires:

This item is filmed at the reduction ratio checked below/  
Ce document est filmé au taux de réduction indiqué ci-dessous.

10x	14x	18x	22x	26x	30x
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12x	16x	20x	24x	28x	32x

The copy filmed here has been reproduced thanks to the generosity of:

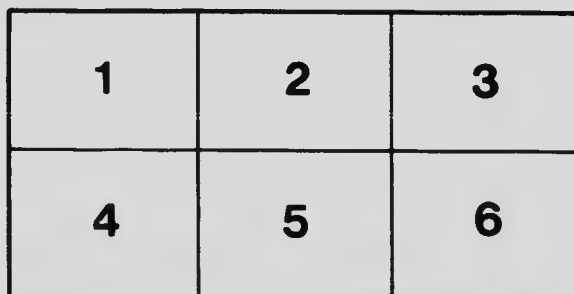
National Library of Canada

The images appearing here are the best quality possible considering the condition and legibility of the original copy and in keeping with the filming contract specifications.

Original copies in printed paper covers are filmed beginning with the front cover and ending on the last page with a printed or illustrated impression, or the back cover when appropriate. All other original copies are filmed beginning on the first page with a printed or illustrated impression, and ending on the last page with a printed or illustrated impression.

The last recorded frame on each microfiche shall contain the symbol ➡ (meaning "CONTINUED"), or the symbol ▼ (meaning "END"), whichever applies.

Maps, plates, charts, etc., may be filmed at different reduction ratios. Those too large to be entirely included in one exposure are filmed beginning in the upper left hand corner, left to right and top to bottom, as many frames as required. The following diagrams illustrate the method:



L'exemplaire filmé fut reproduit grâce à la générosité de:

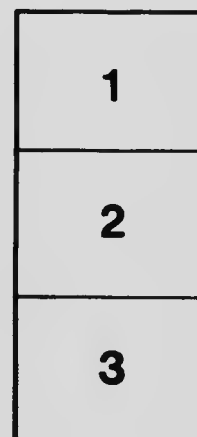
Bibliothèque nationale du Canada

Les images suivantes ont été reproduites avec le plus grand soin, compte tenu de la condition et de la netteté de l'exemplaire filmé, et en conformité avec les conditions du contrat de filmage.

Les exemplaires originaux dont la couverture en papier est imprimée sont filmés en commençant par le premier plat et en terminant soit par la dernière page qui comporte une empreinte d'impression ou d'illustration, soit par le second plat, selon le cas. Tous les autres exemplaires originaux sont filmés en commençant par la première page qui comporte une empreinte d'impression ou d'illustration et en terminant par la dernière page qui comporte une telle empreinte.

Un des symboles suivants apparaîtra sur la dernière image de chaque microfiche, selon le cas: le symbole ➡ signifie "A SUIVRE", le symbole ▼ signifie "FIN".

Les cartes, planches, tableaux, etc., peuvent être filmés à des taux de réduction différents. Lorsque le document est trop grand pour être reproduit en un seul cliché, il est filmé à partir de l'angle supérieur gauche, de gauche à droite, et de haut en bas, en prenant le nombre d'images nécessaire. Les diagrammes suivants illustrent la méthode.



Car.  
Pam.

Grand Trunk Railway Co.

*The Eldorado  
New Ontario*

# *Cobalt*

THE

**Rich New Silver District**

ISSUED BY

**GENERAL PASSENGER DEPARTMENT  
GRAND TRUNK RAILWAY SYSTEM**

# COBALT

---

## Briefly Historical

---

The builders of the Temiskaming & Northern Ontario Railway uncovered some rich veins of cobalt-silver ore when they had reached a point 103 miles north of North Bay, the northern terminus of the Grand Trunk Railway System and the beginning of the government line.

This was in the spring of 1903, but nobody seems to have formed the faintest idea as to the value of the find. In fact, nothing was heard of the discoveries until late in October of the same year, when the finding of copper was reported. A month later, Professor Willet G. Miller, Provincial Geologist, was sent by the Bureau of Mines to investigate and report. The Professor was amazed at the prospect. The so-called copper ore was seen to be the richest ore of nickel known, which resembles copper in color. Associated with this were rich ores of silver and cobalt in profusion. Mr. Miller reported to the Bureau that the new camp was a wonder, and later named it Cobalt.

Even then only a few prospectors appear to have believed the tale, for Cobalt struggled through the summer of 1904 without causing a stampede of prospectors to the northern wilderness.

In Canada the State exercises strict control over mining. In some Provinces of the Dominion, but not in Ontario, miners have to pay a royalty to the government on all ore taken out. In the Cobalt district they do not collect a royalty, but the Provincial government compels a prospector to find mineral before he can get title to his claim. The immediate result of this was to cause every man who set a stake to dig deep and bore hard until he found the pay streak. More real prospecting was done in 1905 in and about Cobalt than was ever done before in the same time in a new camp on this continent.

The face of the earth for miles around was furrowed by deep cuts five feet wide and from ten to twenty feet deep. The face of every frowning cliff was picked, hammered, chiseled and blasted in search of silver, and when the snow came to carpet the earth again Cobalt had "Arrived." Even then prospecting did not cease, but has been continued through the winter.

The branch banks which had been doing business in tents, whose cashiers had been sleeping on their arms near the strong box, are building substantial buildings, and the camp in general is beginning to take on form which indicates prosperous permanence.



85-FOOT LEVEL OF THE BUFFALO MINE.

There are three reasons for this prediction:

First, it is easy going, all rail, Pullman sleeping cars to the heart of the mining camp, which may be said to nestle in the very center of the Ontario wilderness.

Second, it's a poor man's camp. It costs only eight to ten cents to take a dollar's worth of dirt from the ground.

Third, the ore is exceedingly valuable, worth from \$30,000 to \$90,000 a car.

In April, 1906, a man tried to sell his claim for \$25,000. Nobody would buy. The owner spent \$400.00 and has \$1,000,000 in sight. Another man offered to sell for \$100,000. The offer was rejected. Ninety days after, the owner received a check for \$100,000 for ore which he had mined with a crew of six or eight men in the meantime.

A blacksmith named La Rose stubbed his toe on a silver slab and discovered La Rose mine. He sold a half interest to the Timmens Company for \$5,000. Later the same company secured the other half for \$27,000. Since that transaction, millions of dollars' worth of ore have been taken out of this mine.

All of these stories and more can be verified at Cobalt camp.

The closing days of 1903 saw the dawn of this new wonder upon the mining world.

The summer of 1904 witnessed considerable prospecting.

In 1905, millions of dollars' worth of ore was taken out.

In 1906, and very early in the year, tens of thousands of prospectors, capitalists and others flocked to the new Eldorado of New Ontario. All the hotels were full of people, the forests full of prospectors whose hearts were full of hope. Those who did not care for the front with its jostle and jam, took up their abode at Temagami, the beautiful summer resort only thirty miles down the line.

From the New England States the road to Cobalt is by the Grand Trunk Railway System via Niagara Falls or via Montreal. From New York south and west as far as Pittsburg, you come in via Niagara Falls and Toronto over the Grand Trunk to North Bay, with through sleeping cars in season to Temagami and Cobalt. From Chicago, the West and Southwest, take the Grand Trunk at Chicago, making close connection with the through express train leaving Toronto daily. From Detroit, ex-



SLABS OF COBALT.

Silver ore from the New Ontario Mine. The slab standing upright by the hammer weighs 79 pounds, and contains \$500.00 worth of silver.



cellent service via Grand Trunk to Toronto, where close connection is made for Cobalt. (See map, page 20.) Cobalt is distant from—

Portland, Me. ....	796.00 miles.
Montreal, P. Q. ....	498.00 "
Boston, Mass. ....	832.00 "
New York, N. Y. ....	875.99 "
Buffalo, N. Y. ....	447.59 "
Washington, D. C. ....	999.49 "
Pittsburg, Pa. ....	707.59 "
Chicago, Ill. ....	845.36 "
Detroit, Mich. ....	559.52 "
Toronto, Ont. ....	329.89 "
North Bay ....	103.00 "



VIEW OF COBALT FROM THE NORTH.

## MINERALOGY

Cobalt is a comparatively rare mineral, used chiefly for coloring glass and fine china and pottery. It is also used for making paints and pigments, and may be used like nickel for tempering steel. The cobalt associated with the silver here is worth about 60 cents a pound, but so far the ore is mined for the silver, and the price paid for the product of this new camp is based on the silver value alone. Cobalt retails for \$2.50 a pound. The ores carry high value in arsenic and nickel, as well as in cobalt and silver.

The pay dirt in Cobalt is not found in pockets or blow-outs, but in true fissure veins. The richness of the ores found in the Northern forest was such that at first glance it seemed to pass all understanding. To the trained prospector, even to the practiced miner, it "looked good." To the expert, the geologist, who wants to know how and why it came to be, Cobalt was a puzzle. They analyzed the rocks of all the region round about, but found no clue as to the origin of the ores. They searched the records of every silver camp on the continent, but nothing of the kind had ever occurred in this country. Cobalt camp is unique in North America. In fact, all this north country is full of surprises. That broken, rugged

and somewhat inhospitable reef that runs west from the St. Lawrence beyond Hudson Bay, has produced a greater variety of rare minerals than almost any mining region under the sun. What the prospectors of the next year or two, the pathfinders and builders of the Transcontinental Railway, will find, no man may say.

Among the economic minerals unearthed so far are the nickel mines of Sudbury, which is one of the two important nickel-producing localities of the world, with the by-products, platinum and palladium. The value of the refined metals now produced from two or three mines at Sudbury is \$10,000,000 a year. It is without doubt one of the greatest metal mining camps on the continent. Its ore bodies will last for centuries.

The corundum deposits of North Hastings, South Renfrew and other areas in Eastern Ontario, which now supply by far the greater part of the corundum consumed in the world.

The unsurpassed feldspar and mica deposits of Frontenac and adjoining counties, and the apatite, graphite, pyrite, talc, gold, copper, zinc, lead, fluorite and barite of the same district.

The iron ranges which extend over the great territory in Northern and Northwestern Ontario, but which up to the present have not been developed to a great extent.

In addition to these, it may be said that a few years ago North Hastings possessed the only arsenic plant in North America. More recently the auriferous arsenic ores of Temagami were made known, and lastly a discovery has been made of the series of cobalt-nickel arsenides and silver, which are unique, so far as known, on this continent, and are paralleled by deposits only in Saxony and adjacent regions of continental Europe.



MC KINLEY-DARRAGH MINE.



WEIGHING ORE—THE NANCY HELEN MINE.

The eastern part of this region is also noted for certain minerals which can scarcely be said to be of economic value, but are of great scientific interest. The largest and finest crystals of the mineral zircon in the museums of the world come from Eastern Ontario, as do also sphenes, pyroxenes, scapolites and other crystals. Sodalite, marble and other decorative materials are also found here.

The veins or pay streaks are usually narrow and irregular, sometimes as thin as the blade of a knife—sometimes a foot thick.

Out of some of the wider ores great nuggets have been taken, running as high as 80 and 90 per cent pure silver and weighing three and four hundred pounds. Geologists have been guarded in their predictions as to the future of the camp, but it is believed its life will equal that of the average mining camp. One shaft is already down 70 feet, another 90 feet, while a diamond drill has been driven 340 feet into La Rose, and in each instance the pay streak holds out.

Inasmuch as the camp and the ores found here are new things in the mining world, we may as well confess that no man knows or can know the extent of the find until the whole district, including the northern watershed, has been prospected. In the meantime, nature has been so generous it seems she should be trusted so long as the pay dirt lasts.

Mr. Frank Carpenter, one of the best-known newspaper correspondents in America, visited Cobalt recently, and wrote: "As to the value of the mines, I make no prediction. I know that the silver is here, and there are

vast quantities of it. I have seen thousands of sacks, each holding about a half-bushel of ore which is exceedingly rich, and some of it almost pure silver. I have examined the veins, and have found some that are almost a foot wide, and so rich in silver that I could see it shining out of the rocks. But how much there is of it and how long it will last, I do not pretend to say. The geologists may be right in that it will peter out after a hundred feet or so, and the miners may be right in that there are great wide veins in solid masses of the precious metal far down. From what can be seen on the surface, there are undoubtedly millions of dollars' worth of silver here, and the camp will increase in value as it is developed."

Mr. Cy Warman, another writer as well known, a man with a national if not an international reputation, who has witnessed the growth of many mining camps, including Leadville, Creede and Cripple Creek, in Colorado, declares Cobalt the richest silver camp, so far as surface indications, real nuggets and ore in sight are concerned, on this continent.

Cobalt is intoxicating. It is so fabulously rich in silver that men are



VEIN SHOWING IN SHAFT AT LA ROSE MINE.



AT THE 50-FOOT LEVEL OF THE  
O'BRIEN MINE.

apt to fancy they can go up to the new camp, stake out a claim, and begin shipping ore.

But it is not quite so easy as that. The purpose of a pamphlet of this sort is to give reliable information, but there is a thorn for every rose, and the prospector who goes to Cobalt should be prepared to travel the rough, unbroken trail. He will, in many cases, be the first man to travel it, and he will find it something hard. There are lakes and swamps and great, wide rivers, cold and deep. There, also, in the early summer, are large mosquitoes and small black flies. By way of compensation, there are fish and game, wild berries in abundance, and a fortune if you find the fissure.

And, somewhere in this wild, watered wilderness, there are diamond fields, so the experts say, and all for the finding. The provincial geologist

says a prospector entering the district in search of cobalt-silver deposits should first make himself familiar with the various classes of rocks shown on the map, otherwise he may spend his time on the least promising outcrops. Good exposures of the Keewatin greenstones are to be seen along the shore of Lake Temiskaming, immediately to the south of Haileybury, and along the line of railway between Cobalt Lake and Bass Lake. The latter exposures contain numerous small cracks filled with white calcite, which assist in distinguishing these rocks from the near-by rather massive graywacke slates of the lower Huronian. A typical variety of the diabase or gabbro, later in age than the Huronian, is to be seen in the first rock cut on the railway south of Haileybury.

A great variety of minerals is found in the veins, and the prospector should visit some of the working properties near Cobalt station, and become acquainted with the general character of the ore. The following is a list of minerals which have been found in the veins. If any of these are strange to the prospector, he should procure a text-book of mineralogy and read descriptions of them.

**ORES.**—The chief ores are native silver, smaltite or diarsenide of cobalt, niccolite or arsenide of nickel, chloanthite or diarsenide of nickel, associated with which are argentite or sulphide of silver, pyrrargyrite or sulph-

antimonide of silver, dyscrasite or antimonide of silver, erythrite or cobalt bloom, annabergite or what may be called nickel bloom, millerite or sulphide of nickel, native bismuth, tetrahedrite or sulph-antimonide of copper and other metals, mispickel or sulph-arsenide of iron, and occasionally graphite. Erythrite and annabergite are the hydrated arsenates of cobalt and nickel, respectively. They are both decomposition products. Asbolite and other minerals of similar origin are present. The more common minerals, galena, copper pyrites, iron pyrites and zincblende, together with oxide of manganese, occur in small quantities, especially in the country rock. Other minerals are found, but generally in such an impure form that their characters have not been definitely determined. Calcite is the chief vein stone, but some of the veins have little even of it. Quartz and fragments of the wall rock are found in some of the ore.

The outcrops of the veins usually show native silver and cobalt bloom. The latter is a good indicator, its delicate pink color having a striking appearance. It is apt to be confused only with certain tints of red oxide of iron. If the bloom is, however, carefully heated, which can be done in the cover of a tin can over a camp fire, it will be found to turn blue. If fused with borax, it imparts a beautiful blue color to the resulting glass. The native silver exposed at the outcrops will, of course, be tarnished. Its color can be determined by cutting it, and its weight is characteristic. Native bismuth, with fresh surfaces, looks like silver, but is more easily cut, and on exposure tarnishes a reddish color. The other important mineral in the above list which is not brittle and is easily cut is argentite.



TRETHEWEY MINE.

Prospectors have mistaken it for lead, but it is black in color. The veins are narrow, the width of the ore averaging, in the veins which have been worked, probably ten or twelve inches, and may be easily passed over by those accustomed to prospecting in other fields. Fragments of rock should be frequently broken off the ledges. Bloom has been discovered by this means in outcrops where its presence was not suspected. Cracks in rock should be cleaned out with a prospecting pick. A vein of these ores, a few inches in width, is worth much labor.

SHIPMENTS.—From five small veins which have been opened up during the last few months in an area which is less than one mile in length from north to south, and about one-half mile in breadth from east to west, surrounding Cobalt station on the recently constructed Temiskaming & Northern Ontario Railway, something like \$400,000 worth of ore has been shipped. With one exception, the vein on the north of R. L. 404 near Cobalt Lake, all of these veins carry high values in silver, besides important amounts of cobalt, nickel and arsenic. The composition of shipments (car-loads) from one of the silver-bearing veins (1), and from the vein which does not carry silver values (2) is seen from the following results of analyses:—

(1)		Per cent.	(2)		Per cent.
Silver	.....	11.41	Cobalt	.....	15.60
Cobalt	.....	11.27	Nickel	.....	7.00
Nickel	.....	3.78	Arsenic	.....	61.74
Arsenic	.....	44.16			

Silver brings about 60 cents per Troy ounce, and about 90 per cent of the value is paid for the metal in the ore. Cobalt has sold for 60 to 65 cents, nickel at 12 to 15 cents, and arsenic at about 1 cent a pound, in the ore.

VEINS.—The veins occupy almost vertical cracks or fissures which cut across the beds of the usually slightly inclined conglomerate-slate series of the Lower Huronian. From the map it will be seen that there are three isolated belts of these rocks, with a strike approximately northeast and southwest, between the east shore of Sasaginaga Lake and a line joining the northeast end of Giroux Lake with the southeast end of Cross Lake. Veins have been found in all of these belts.

The veins, however, do not all have the same strike. Those on J. B. 6, J. B. 7 and that near the southwest corner of R. L. 404 strike approximately east and west, while those on J. S. 14 and J. B. 1 strike more nearly northeast and southwest. On the north end of R. L. 404 the vein strikes approximately southeast and northwest. These veins are indicated by a sign on the map, the line showing approximately the direction of the strike.

It may be added that there are one or two exceptions to the statement that the silver-cobalt ores occur in the Lower Huronian rocks. Near the southwest corner of Cross Lake, for example, native silver has been found in diabase or gabbro, and cobalt bloom occurs in a similar rock on the

north end of lot 2, concession III of Dymond, and on the south end of the lot across the road to the north. In both cases the diabase has been at one time overlaid by the Lower Huronian, which in all likelihood contained veins. The last-mentioned locality is over eight miles north of the deposits near Cobalt station. Cobalt bloom has also been found staining the Keewatin, at the shore of Temiskaming in the southeast corner of Bucke. It is the writer's opinion, however, based on the discoveries already made, that the prospector for silver and cobalt should confine his attention practically to the Lower Huronian series.

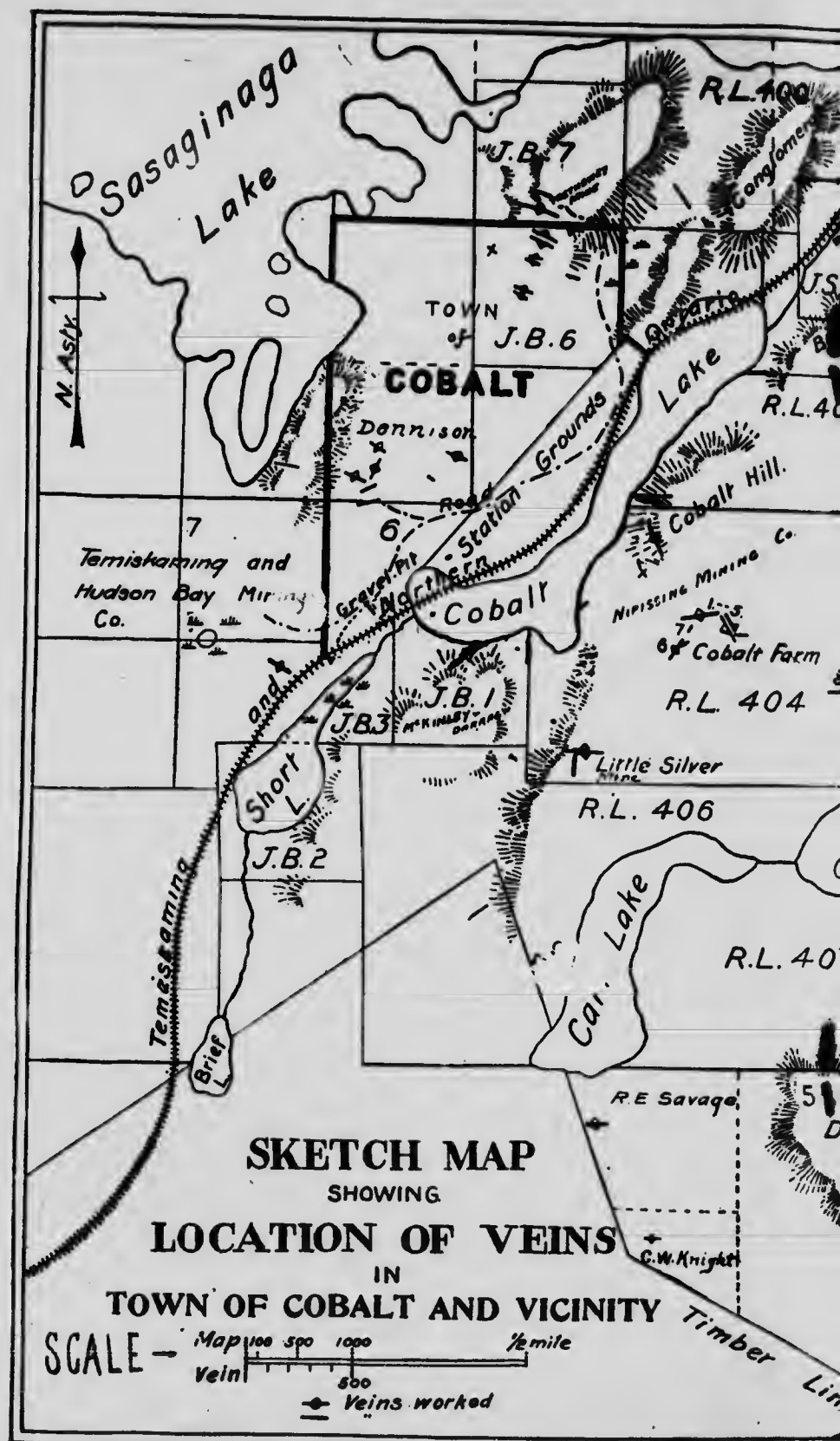
### THICKNESS OF LOWER HURONIAN

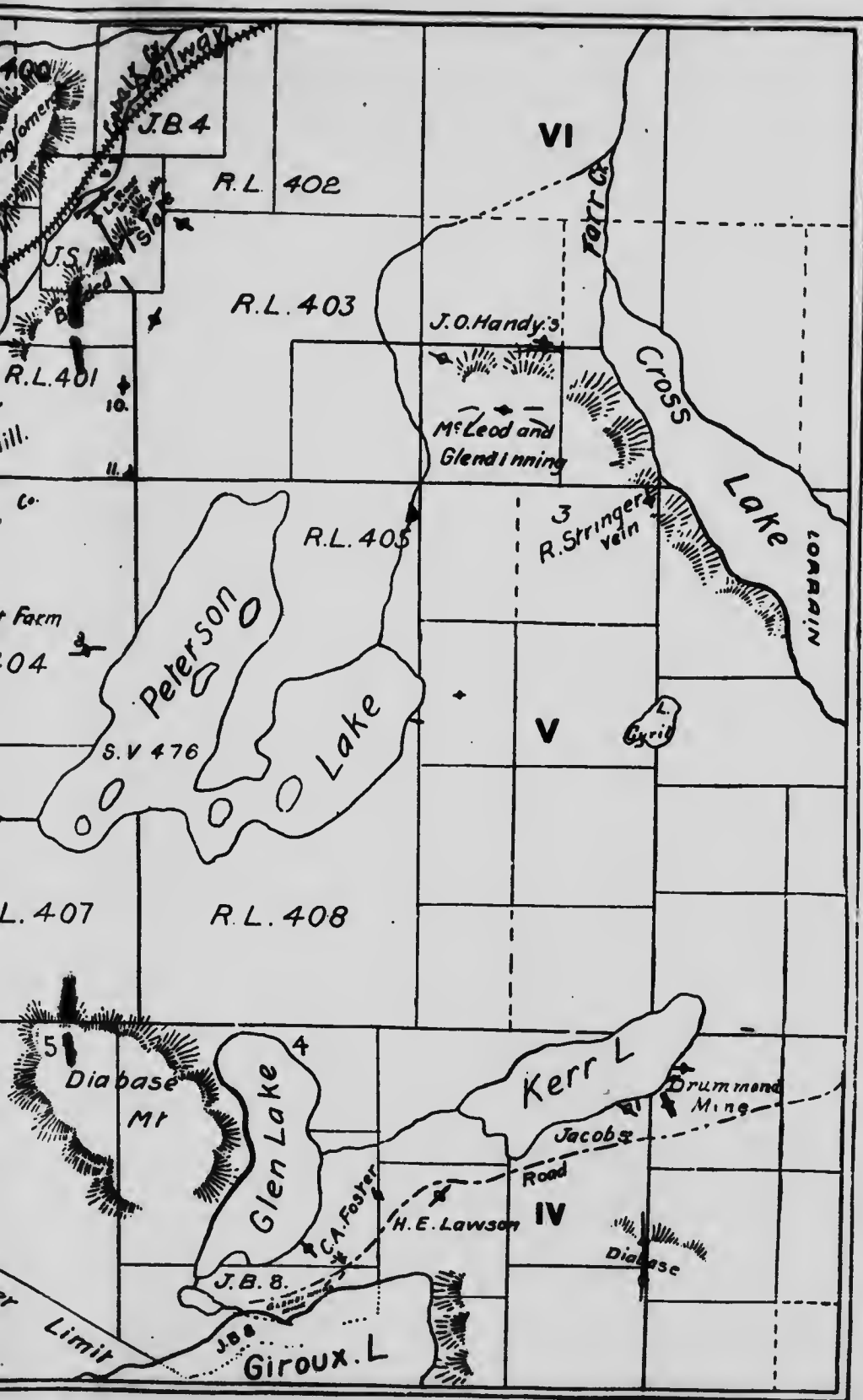
Since the Lower Huronian is simply a fragmental series—at one time in the form of gravel and other material in a state of finer division, which was deposited on the eroded, uneven surface of the Keewatin and Laurentian—it becomes of importance to know what thickness any of this series, filling old valleys and depressions, has. All that can be said on this point is that the exposures on the hills near Cobalt station are about 500 feet higher than similar ones at the shore of Temiskaming, low water level. The series may therefore in some places have a thickness of at least 500 feet. Before erosion took place it was undoubtedly much thicker.



THE CANADIAN BANK OF COMMERCE, COBALT.







## DISTRIBUTION OF ROCKS

Isolated outcrops of these Lower Huronian rocks in this part of north-eastern Ontario are found in an area which stretches for a distance of about 75 miles, from south of Lake Temagami to the height of land, and westward for a considerable distance. It remains to be determined whether cobalt-silver deposits are to be found in many of these outcrops. The minerals have already been discovered, in a north and south direction, along a line eight or nine miles in length, and in an east and west direction for about four miles. Judging from reports of recent discoveries, similar deposits occur much farther to the north.

## ORES OF THE KEEWATIN

The Keewatin, which is also extensively developed in this part of Ontario, contains characteristic economic minerals. It is the series in which the iron ore formations of Temagami, and the township of Boston, 75 miles to the north, occur. An outcrop, only about 25 feet in length, of a similar ore is found at Sharp's Landing near the shore of Temiskaming. This outcrop is part of a buried iron range which runs northwestward into the township of Hudson, where large angular blocks of it are found in the conglomerate of the Lower Huronian, and in all probability beyond. From the map it will be seen that this iron range is buried pretty deep in parts of its course. At Sharp's Landing it is overlaid by the Lower Huronian. A little farther westward the Niagara limestone and thick deposits of recent clays tend to bury the range still deeper, and it is also cut across by the tongue of diabase which traverses this part of the field.

On location J. S. 32, on the Montreal River, an iron pyrites deposit is found in the Keewatin. Near Temagami, twenty miles or so to the southward, two mispickel deposits carrying gold are being developed. It is interesting to note that the arsenic in the Keewatin is combined with iron in mispickel which is gold-bearing, while the arsenic compounds of the Lower Huronian are essentially those of the other magnetic elements, cobalt and nickel, and are associated with silver. These ores of Temagami and near Cobalt station should warrant the erection, at some point along the railway, of an arsenic refining works, which could treat the ores of both localities.

Little of Northern Ontario has yet carefully been explored. Great possibilities are in store for the pathfinder and prospector.

*Mr. Eugene Haanel, Superintendent of Mines, to Hon. Frank Oliver,  
Minister of the Interior.*

OTTAWA, December 28, 1906.

In accordance with your instructions of November 28, to proceed to Cobalt, and prepare a report showing the present and prospective output of the mines in that locality, the report to contain also a statement as to the methods by which the metals are extracted from the ore and the cost of the operations involved, I proceeded at once to Cobalt, where I visited all the important shipping mines for the purpose of obtaining the required information regarding output.

The following is a statement of the quantity of ore shipped, obtained from the records of the railroad company at Cobalt, and the notes taken at the different mines of the prospective shipments for the year 1907:—

SHIPPING RETURNS OBTAINED FROM TEMISKAMING AND NORTHERN ONTARIO  
RAILROAD, COBALT STATION.

*La Rose.*

	Lb.	Tons.
January, to Bergen Jct. ....	40,000	
February, to Bergen Jct. ....	30,000	
March, to Bergen Jct. ....	128,620	
May, to New York .....	126,000	
June, to New York .....	109,700	
June, to Hamilton .....	40,000	
July, to Newark .....	122,600	
July, to New York .....	59,400	
August, to Hamilton .....	43,000	
September, to New York .....	56,000	
September, to Bergen Jct. ....	130,000	
October, to Bergen Jct. ....	43,000	
October, to New York .....	53,600	
November, to New York .....	495,000	
	<u>1,476,920</u>	738.46

*Star Silver Cliff Mining Co. (now the Nova Scotia).*

	Lb.	Tons.
July, to New York .....	40,860	
November, to New York .....	47,040	
	<u>87,900</u>	43.95

*Silver Queen.*

	Lb.	Tons.
July, to Newark .....	60,170	
October, to Newark .....	87,630	
October, to New York .....	98,340	
	<u>246,140</u>	123.07

*Nipissing.*

	Lb.	Tons.
January, to Copper Cliff .....	642,320	
February, to New York .....	38,180	
March, to New York .....	180,000	
March, to Bergen Jct. ....	60,000	
April, to New York .....	169,600	
May, to New York .....	313,100	
June, to New York .....	42,740	
July, to New York .....	85,470	
August, to New York .....	272,720	
September, to New York .....	424,240	
September, to Bergen Jct. ....	57,750	
October, to New York .....	970,830	
November, to New York .....	199,715	
	<u>3,456,665</u>	1,728.33

*Trethewey, J. B. VII.*

	Lb.	Tons.
March, to Bergen Jct. ....	60,000	
August, to Bergen Jct. ....	58,200	
August, to Perth Amboy .....	53,400	
September, to Bergen Jct. ....	58,000	
October, to Bergen Jct. ....	180,000	
October, to Perth Amboy .....	216,000	
November, to Perth Amboy .....	106,770	
	<u>732,370</u>	366.33

*Foster.*

	Lb.	Tons.
October, to Bergen Jct. ....	127,000	
November, to Bergen Jct. ....	47,000	
	<u>174,000</u>	87.00

*Kerr Lake.*

	Lb.	Tons.
January, to New York .....	41,400	
March, to Bergen Jct. ....	60,000	
July, to Bergen Jct. ....	56,000	
September, to Bergen Jct. ....	85,000	
	<u>242,400</u>	121.20

*Coniagas.*

	Lb.	Tons.
November, to Perth Amboy .....	180,000	
November, to Bergen Jct. ....	60,000	
	<u>240,000</u>	120.00

# COBALT

19

## Buffalo.

	Lb.	Tons.
February, to Bergen Jct. ....	40,100	
March, to Bergen Jct. ....	40,000	
March, to Jersey City ....	63,000	
May, to Jersey City ....	355,900	
June, to Perth Amboy ....	141,500	
June, to Jersey City ....	60,000	
July, to Jersey City ....	120,000	
July, to Perth Amboy ....	44,900	
July, to Copper Cliff ....	175,800	
August, to Copper Cliff ....	45,600	
August, to Jersey City ....	60,000	
September, to Chrome, N. Y. ....	100,000	
September, to Copper Cliff ....	33,800	
September, to Jersey City ....	60,000	
October, to Perth Amboy ....	120,000	
October, to Jersey City ....	80,000	
November, to Perth Amboy ....	280,000	
	<u>1,825,600</u>	912.30

## Violet.

	Lb.	Tons.
September, to New York .....	<u>40,000</u>	20.00

## University.

	Lb.	Tons.
January, to Newark .....	40,000	
February, to Bergen Jct. ....	40,300	
March, to Bergen Jct. ....	62,000	
April, to Bergen Jct. ....	60,000	
September, to Bergen Jct. ....	63,250	
October, to Bergen Jct. ....	45,000	
	<u>310,550</u>	155.27

## McKinley-Darragh-Savage.

	Lb.	Tons.
July, to Copper Cliff * .....	54,000	
October, to New York .....	<u>60,000</u>	
	<u>114,000</u>	57.00

## Drummond.

	Lb.	Tons.
April, to Copper Cliff .....	44,800	
June, to Copper Cliff .....	85,300	
December, to Copper Cliff .....	<u>80,000</u>	
	<u>210,100</u>	105.05

\*Tonnage approximate.

## COBALT

*Green & Meehan.*

	Lb.	Tons.
November, to Bergen Jct. ....	34,050—	17.03

*L. Downey.*

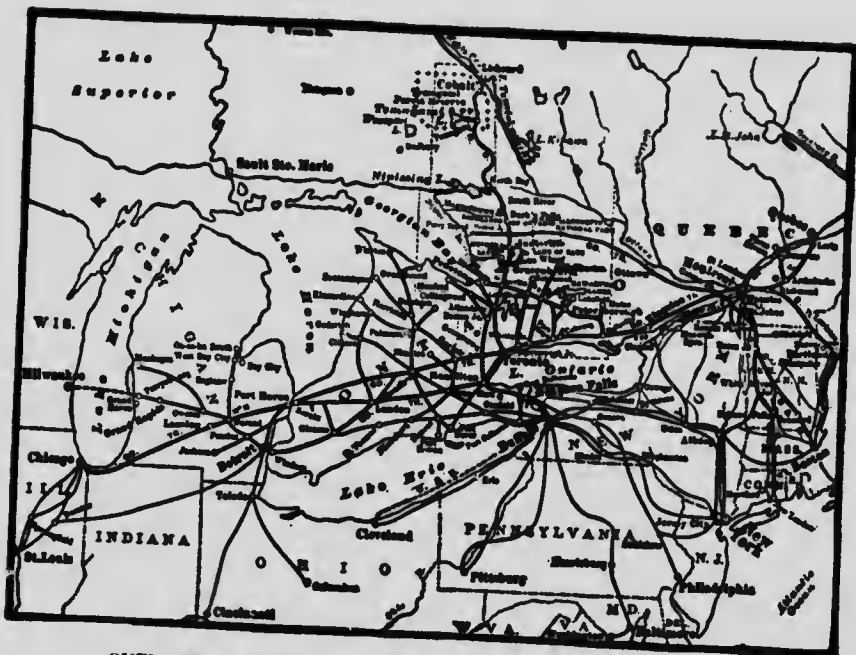
	Lb.	Tons.
February, to Bergen Jct. ....	46,930—	23.45

*Colonial.*

	Lb.	Tons.
February, to Bergen Jct. ....	30,000—	15.00

*Bailey.*

	Lb.	Tons.
October, to Bergen Jct. ....	60,000—	30.00
		4,663.44



OUTLINE MAP SHOWING COBALT AND ITS ACCESSIBILITY.

# COBALT

---

## An Afterward

---

Cobalt is now in its third year, and the reports of prospectors, miners and mining experts reveal nothing which necessitates a revision of the foregoing pages. Nothing has happened to dampen the ardor or check the optimism of the most enthusiastic Cobalter.

The history of mining camps on this continent proves that the better the camp, the greater the field for the faker, the wildcat incorporator and the professional promoter. Cobalt has its share of these adventurers, but, on the whole, the mines of Cobalt are conducted as mines are in most camps that have come to stay, and the returns from the mills and the Government reports prove the value of the camp beyond dispute. The best thing about Cobalt is that it has "made good" everything said about it save the oft-repeated prediction that the veins would all pinch out not far from the surface. What seemed to be absurd prophecies from the first have been more than fulfilled, and today Cobalt stands better in the eyes of the mining world than at any time since the blacksmith found the first pay rock and staked La Rose. From the outset, Cobalt puzzled the prospector, muddled the miner, and confused the mining expert, and all because of the amazing richness of the rock at the grass roots, and because Cobalt is unlike any other silver camp in the world.

Despite the severe winter of 1906-7, prospecting continued under the snow, and over the ice, to new, unmapped "Eldorados," went supplies to be *cached* for the summer work.

Often the scene of a solitary *cache* becomes the site of a city in the making, between snows. The history of the discovery, settlement and subsequent development of Cripple Creek is being repeated in Cobalt camp. Cobalt, like Cripple Creek, was the first town, but as the prospectors pry into the secrets of the surrounding wilderness, they set new stakes, pitch new tents, build new cabins around and about which a mining camp tributary to Cobalt springs up.

And, as Cripple Creek has her Manitou, attracting hundreds of thousands of tourists annually, Cobalt has her Temagami, one of the wildest and most attractive summer resorts on the American continent.

Leaving the line of the railway midway between Temagami and Cobalt, the pleasure-seeker may steam up the Montreal River for fifteen or twenty miles, turn south through Lady Evelyn Lake, into Lake Temagami, with its three thousand miles of shore line, sail for a day or a month or all



summer long, and take the train out at Temagami station within a few miles of Latchford, where he left the Cobalt train.

And all up the Montreal River, for fifty miles or more, the prospector has plowed up the earth, set his stake, and commenced to mine.

All along the Montreal River are extensive lumbering industries, and at Latchford, on the railway, a big sawmill sings day and night to supply the ever-increasing demand for building material for the new camps.

North of Cobalt, and a little east of the main line of the railway, lies Larder Lake, the new gold camp that is calling the floating rainbow-chasers by the thousand. Men who have placed their faith and put their money on Larder Lake, and who want you to go and do likewise, will tell you that in the great slide south from Somewhere, the golden lava en-



LA ROSE MINE.

countered a granite wall which stopped the golden flood at Larder Lake. South of this wall they find cobalt, silver, nickel and other precious metals, but no gold worth mentioning.

A branch line of the Temiskaming & Northern Ontario, which takes traffic from the Grand Trunk Railway System at North Bay, some two hundred miles north from Toronto, is to be rushed to the Larder Lake country, for the railway, since the people will go, must make the going as easy as may be.

West, as well, there will probably be a demand for a branch line, as the country around Lady Evelyn Lake is attracting many prospectors.

In the meantime the Temiskaming & Northern Ontario is to be pushed north to tap the main line at the Grand Trunk Pacific, the new trans-continental road now being built from Moncton, N. B., to Prince Rupert,

on the Pacific Ocean. Near the junction of these railways there are promising prospects for gold.

And here, too, lies a great and valuable forest, and below it a wide clay belt, extending east and west for hundreds of miles, upon which good wheat has been grown, and where tens of thousands of homesteaders will settle in the near future. On the whole, this New Ontario is an interesting country, and a trip to the present terminus of the railway is well worth the time and money. There are scores of wood-girt lakes, spring-fed and crystal clear, and just north of Cobalt the line skirts the west shore of Lake Temiskaming. Haileybury, five miles north of Cobalt, occupies on this lake one of the prettiest town sites in Ontario. The shore here is neither flat nor steep, but gently sloping from the railway down to the lake. Already they are running suburban trains both ways from Cobalt,



UNIVERSITY MINE.

and an electric line linking the several camps is already planned and will be built immediately.

Cobalt ore is hard to treat. Thousands of dollars are lost in the ordinary processes, and fortunes are left in the dumps at the mines. However, since both the Dominion and the Provincial Governments are aiding investigators and experimenters, no doubt a new and special process will be found by which all the by-products can be saved.

As might have been expected, the discovery of this unique ore deposit found Canada unprepared. Thus far most of the output has gone to three firms—

The American Smelting and Refining Company, who have their smelting works at Perth Amboy, New Jersey, with head office at 71 Broadway, New York.

The Balbach Smelting and Refining Company at Newark, New Jersey.  
The Orford Copper Company at Copper Cliff, Ont., with head office at 43 Exchange Place, New York.

The American Smelting and Refining Company and the Balbach Smelting and Refining Company have no process for saving cobalt, nickel or arsenic contents of the ore. They are both extensive lead smelters, and the process employed for saving the silver contents is to use the lead ores as a collector. No detailed description of the process is obtainable, nor can anything be learned regarding costs of extraction.

The following are the terms on which they receive and treat the ores from the Cobalt district:—

#### THE AMERICAN SMELTING AND REFINING COMPANY.

Silver: Pay for 94 per cent of contents at New York quotations as given on date of assay settlement by Messrs. Handy and Harman to Western Union Telegraph Company.

Treatment charge: \$10 per ton of 2,000 pounds of ore, dry weight.

Payment: Cash immediately on agreement of assays.

The above terms are F. O. B. cars in the yard of their works at Perth Amboy, N. J.

Cars may be stopped and ore sampled in transit by Messrs. Ledoux & Co., whose sampling will be accepted as a basis of settlement, if given opportunity to have a representative of the Company present during the process. Weights to govern would be those of the Perth Amboy plant.

The American Smelting and Refining Company do not pay for cobalt contents, as in their processes they are unable to recover this element.

The Balbach Smelting and Refining Company receive silver ore, if not too high in arsenic, upon the following terms:—

Ore running 400 oz. silver per ton, smelting charge, \$6 per ton.

Above 400 to 500 oz. silver per ton, smelting charge, \$5 per ton.

Above 500 to 600 oz. silver per ton, smelting charge, \$4 per ton.

Above 600 to 700 oz. silver per ton, smelting charge, \$3 per ton.

Above 700 to 800 oz. silver per ton, smelting charge, \$2 per ton.

Above 300 oz. silver per ton, no smelting charge.

They pay 93 per cent of the silver contents of the ore at the New York market price for silver ruling on the day of agreement of assays. Settlement, 14 days after agreement of assays, or cash less one per cent.

#### PROSPECTIVE SHIPMENTS FOR 1907;\* FOR 12 MONTHS.

Mine.	Tons.
La Rose .....	738.00
Nova Scotia .....	275.00
Cobalt Silver Queen .....	†
Kerr Lake Mining Co. ....	600.00
Coniagas .....	1,344.00

	Tons.
Buffalo Mines, Ltd. ....	480.00
Nipissing Mining Co. ....	3,600.00
J. B. VII .....	1,344.00
Foster .....	300.00
Bailey .....	30.00
Violet .....	†
University .....	336.00
McKinley-Darragh-Savage .....	†
Drummond .....	336.00
Green & Meehan .....	†
L. Downey .....	†
Colonial .....	1,680.00
Silver Cliff Mining Co. ....	600.00
Gillies' Limit .....	120.00
Right-of-Way Mining Co. ....	120.00
Cobalt-Townsite Mining Co. ....	100.00
Total.....	12,003.00
Approximate value .....	\$12,530,152.00

\*The amount of the prospective shipments for the year 1907 will be materially increased by the shipment from some of the mines now under development and the removal of embargo on mines now in litigation.

†Information of prospective tonnage could not be obtained.

‡No prospective shipments.

#### SUMMARY OF ORE SHIPPED, AS OBTAINED FROM MANAGERS OF MINES.

Mine and Date.	Tons.
La Rose, Jan.-Nov., 1906 .....	738.46
Nova Scotia, July-Nov., 1906 .....	43.00
Cobalt Silver Queen .....	123.07
Kerr Lake Mining Co. ....	121.20
Coniagas, Nov. 29, 1905, to Nov. 17, 1906.....	208.00
Buffalo Mines, Ltd., May 8, 1906, to Nov. 30, 1906.....	920.00
Nipissing Mining Co., 1904 to Nov. 22, 1906 .....	1,565.13*
J. B. VII, March-Nov., 1906 .....	366.18
Foster, Oct.-Nov., 1906 .....	87.00
Bailey, Oct., 1906 .....	30.00
Violet, Sept., 1906 .....	10.00
University, Jan.-Oct., 1906 .....	155.27
McKinley-Darragh-Savage, July-Oct., 1906 .....	57.00†
Drummond, April-September, 1906 .....	105.05
Green & Meehan, November, 1906.....	17.03
L. Downey, February, 1906 .....	23.45
Colonial, February, 1906 .....	15.00
	4,584.84
Approximate value .....	\$4,283,369.02

\*Tonnage shipped to correspond with data furnished by the manager.  
Value, \$2,046,336.95.

†Approximate.

### EXPERT OPINION OF THE CAMP

---

Professor Willet G. Miller, Provincial Geologist of Ontario, in writing to the *Monetary Times*, of Toronto, says, under date of July 10, 1906:—

"The progress of the camp as a whole during the last year may be summarized as follows: All the old properties which I have examined in the vicinity of Glen, Kerr and Cobalt Lakes are looking even better than they did a year ago. Important finds of veins, unknown a year ago, have been made on several of the older properties. It should also be noted that very few important finds of rich silver veins have been made outside of the boundaries of the old properties during the last year. These older properties are numerous enough to make the camp an important one. Few areas of the same size in North America have as many producing mines."

Professor Miller was the first geologist of note to visit Cobalt. He gave the Town, Lake and Coleman Township their names. He has visited the camp many times, and is spending the entire summer on the Gillies Timber Limit with a party of fifteen geologists and prospectors. Professor Miller undoubtedly knows more from actual experience and observation of the geology and mineralogy of the Cobalt district than any other scientist in the field, and his statements may be considered authoritative.

For full information regarding routes and rates, call on or write to any of the following Grand Trunk Railway System agencies, when full particulars will be sent.

### PASSENGER AND TRAVELING AGENTS

**Alexandria Bay, N.Y.** Cornwall Bros.. Ticket Agents.  
**Baltimore, Md.**.....Theo. H. Diener & Co. Ticket Agents, 217 E. Baltimore St.  
**Battle Creek, Mich.**.....L. J. Bush .... Passenger Agent, G. T. Station.  
**Bay City, Mich.**.....H. G. Smith..... Passenger Agent, G. T. Station.  
**Boston, Mass.**.....T. H. Hanley.....New England Passenger Agent, 360 Washington St.  
**Buffalo, N. Y.**.....J. M. Shea.....Traveling Passenger Agent, 360 Washington St.  
**Buffalo, N. Y.**.....H. M. Morgan....City Passenger and Ticket Agent, 285 Main St.  
**Chicago, Ill.**.....J. H. Burgis... City Passenger and Ticket Agent, 249 Clark St.,  
 cor. Jackson Boulevard.  
 ".....F. E. Scott..... Tkt. Agt., Auditorium Annex, cor. Mich. Ave. and  
 Congress St.  
 ".....O. C. Bryant.... Trav. Passr. Agt., Room 917, Merchants' Loan &  
 Trust Bldg.  
 ".....M. J. Corahan.. Trav. Passr. Agt., Room 917, Merchants' Loan &  
 Trust Bldg.  
**Cortland, N. Y.**.....Frank Parmelee Co., Ticket Agents, Palmer House.  
**Detroit, Mich.**.....R. Bushby..... Eastern Passenger Agent, 6 Burgess Block.  
 ".....C. C. Craigie... Traveling Passenger Agent, 121 Woodward Ave.  
 ".....Geo. W. Watson.. City Pass'r and Tkt. Agt., 121 Woodward Ave.  
**Flint, Mich.**.....L. B. Chrouh... Passenger Agent, G. T. Station.  
**Glasgow, Scotland**.... Fred. C. Salter.. European Traffic Agent, 75 Union St.  
**Grand Rapids, Mich.**... C. A. Justin... City Pass'r and Tkt. Agt., 97 Monroe St., Morton  
 House Bldg.  
**Hamilton, Ont.**.....C. E. Morgan.... City Pass'r and Tkt. Agt., 11 James St. North.  
**Kansas City, Mo.**.....F. W. Hopper... Traveling Pass'r Agt., 327 Sheildy Bldg.  
**Kingston, Ont.**.....J. P. Hanley.... City Passenger and Ticket Agent.  
**Lansing, Mich.**.....F. H. Potter.... Passenger Agent, G. T. Station.  
**Liverpool, Eng.**.....Fred. C. Salter.. European Traffic Agt., 20 Water St.  
**London, Ont.**.....E. De la Hooke.. City Pass'r and Tkt. Agt., cor. Richmond and  
 Dundas Streets.  
**London, Eng.**.....Fred C. Salter .. European Traffic Agent, 44, 45 and 46 Leadenhall  
 Street, E. C.  
**Los Angeles, Cal.**.....W. H. Bullen.... Pacific Coast Agent, 302 Wilcox Building.  
**Milwaukee, Wis.**.....Crosby Trans Co., 396 East Water Street.  
 ".....R. G. Butler.... General Agent, Milwaukee Dock.  
**Minneapolis, Minn.**... W. J. Gilkerson.. Traveling Passenger Agent, 713 Metropolitan Bldg.  
 (formerly Guaranty Building).  
**Montreal, Que.**.....J. Quinlan..... District Passenger Agent, Bonaventure Station.  
 ".....C. W. Johnston.. Traveling Passenger Agent, Bonaventure Station.  
 ".....M. O. Dafee..... Traveling Passenger Agent, Bonaventure Station.  
 ".....W. H. Clancy... City Passenger and Ticket Agent, 137 St. James St.  
**Mt. Clemens, Mich.**... H. F. Weeks.... City Pass'r and Tkt. Agt., 12 South Gratiot Ave.  
**New York, N. Y.**.....F. P. Dwyer.... General Agt. Passenger Dept., Railway Exchange,  
 290 Broadway.  
**Niagara Falls, Ont.**... G. A. Major..... Ticket Agent, Clifton Hotel.  
**Niagara Falls, N. Y.**... D. Isaacs..... Ticket Agent, Prospect House.  
 ".....W. J. Hamilton.. Ticket Agent, 29 Falls St.  
**Norfolk, Va.**.....R. McC. Smith.. Special Passenger Agent, Jamestown Exposition.  
**Ogdensburg, N. Y.**.... Geo. S. Meagher.. Ticket Agent, 55 State St.  
**Ottawa, Ont.**.....Percy M. Buttler.. City Passenger & Ticket Agent, Russell House Bldg.  
 cor. Sparks & Elgin Sts.  
**Peterboro, Ont.**.....W. Bunton..... City Passenger and Ticket Agent.  
**Pittsburg, Pa.**.....W. Robinson... Traveling Passenger Agent, 506 Park Building.  
**Port Huron, Mich.**.... C. R. Clarke.... Ticket Agent, G. T. Ry. Station.  
**Quebec, Que.**.....C. E. Tenny... C. P. & T. A., cor. St. Anne and Du Fort Sts., and  
 Ferry Landing, Dalhousie St.  
**Saginaw, Mich.**.....J. W. Waters.... Passenger Agent, G. T. Station.  
**San Francisco, Cal.**... W. O. Johnson.. Agent, 399 Monadnock Building.  
 ".....Zappettini & Perasso, Passenger Agents, 15 Montgomery Ave.  
**Sherbrooke, Que.**.... C. H. Foss..... City Passenger and Ticket Agent, 2 Wellington St.  
**South Bend, Ind.**.... C. A. McNutt.... Passenger Agent, G. T. Station.  
**Toronto, Ont.**.....J. D. McDonald.. District Passenger Agent, Union Station.  
 ".....C. S. Proctor.... Traveling Passenger Agent, Union Station.  
 ".....W. Duperow.... Traveling Passenger Agent, Union Station.  
 ".....C. E. Horning... City Passenger and Ticket Agent, northwest cor.  
 King and Yonge Streets.  
 ".....Reg. Beaumont.. Jr. Trav. Pass. Agt., G. T. R. Sys., & Nth. Nav. Co.,  
 Union Station.  
**Washington, D. C.**.... G. W. Moss, Passenger Agent, 1411 G. St. N. W.  
**Winnipeg, Man.**.....A. E. Duff..... Gen. Agent Pass. Dept., 260 Portage Avenue.

**CHAS. M. HAYS,**  
 Second Vice-Prest & Gen'l Mgr.,  
 MONTREAL.  
**W. E. DAVIS,**  
 Pass'r Traffic Mgr.,  
 MONTREAL.  
**G. T. BELL,**  
 Gen'l Pass'r & Tkt. Agt.,  
 MONTREAL.  
**GEORGE W. VAUX,**  
 Asst. Gen. Pass. & Tkt. Agt.,  
 CHICAGO.  
**H. G. ELLIOTT,**  
 Asst. Gen. Pass. & Tkt. Agt.,  
 MONTREAL.  
**W. P. HINTON,**  
 Asst. Gen. Pass. and Tkt. Agt.,  
 MONTREAL.

## THE TEMAGAMI REGION

Temagami—"Deep Water"—how apt are the Indians in the selection of names, and yet they might have called it "clear water," and it would have been equally apropos, for you will not find elsewhere on this continent, save off the southwest coast of California, waters so crystal clear as are the waters of the lakes of the Temagami country. That these little, limpid, wood-girt seas should lie so long, almost at the heart of the continent, unexplored and practically unknown for two hundred years, is due to the fact that until recently no railway had built that way. Now, however, the pathfinder has passed that way, has opened a steel trail, so that during the fishing and shooting season of 1907, you, who are tired of the old, worn trails, may have your first peep into this new sportsman's Paradise. They are passing rapidly, these "silent places." The march of Empire has reached the Pacific Ocean. The eastern sportsman, voyageur and explorer have wiped out the West, and are turning to the North. The white man, in his ceaseless search for the earth's endowments, is now wiping out the wilderness. A little while and the "forest primeval" shall be no more. In all probability we of this generation will be the last to relate to our grandchildren the stirring stories of the hunt in the wild forests of Canada.

Therefore, it behooves you, O mighty hunter, to go forth and capture your caribou or moose while you may. The scenes are shifting. Civilization is shoving the wild things farther and farther to the North. But you who are lucky enough to live today, may hurry to these last fastnesses and find here the rarest sport to be had in all North America.

And it's all so easy, too. Thirty hours from Boston, twenty-four hours from New York or Chicago, will take the traveler to the heart of the happiest hunting ground upon this mundane sphere.

The word "Temagami" is derived from the Indian word "Temagamingue," meaning "the place of deep water," and is applied to a magnificent territory in New Ontario, that embraces all the attractions that are sought after by the canoeist, tourist, angler and hunter. It is, comparatively speaking, a region known only to a few who have been fortunate enough to traverse the district, under adverse circumstances, owing to the difficulty experienced in reaching its confines. This, however, has been overcome by the building of a new railway through the heart of this grand territory, opening up the way for the summer visitors who are looking for new fields to explore, and to the lover of nature and outdoor recreation.

Without a personal visit to "Temagami," no one has any idea of the amount of pleasure that is expressed in this one word, and versatile language is not subtle enough to impart an adequate description of its natural beauties and the story of its fourteen hundred odd islands in Lake Temagami, the principal lake of the district, and its thousand and one smaller lakes within a comparatively small area, holding forth unlimited attractions to the canoeist and lover of rod and gun. The Temagami region is a forest reserve, under the control of the Ontario Government, and covers an area of 1,400,000 acres. The Temagami region is reached through Temagami station, a distance of 30 miles south of Cobalt, or Latchford, a distance of about 10 miles south of the new Eldorado. There is good hotel accommodation on Lake Temagami, three large hotels at different points on the lake catering to the wants of the angler, sportsman and tourist. A beautiful booklet, descriptive of this region, profusely illustrated with halftones from direct photographs, will be sent to any one applying for same to any of the Grand Trunk Railway agencies, a list of which is given on the following page.

